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Remedial Action Plan for the
Ground-Water Collection System
Firestone Tire and Rubber Company Site
Albany, Dougherty County, Georgia
ATEC Project Number 32-07-96-00156 Task 22

Prepared for:

Bridgestone/Firestone, Inc.
Nashville, Tennessee

July 25, 1996

ATEC Associates, Inc.

1300 Williams Drive, Suite A
Marietta, Georgia 30066-6299
(770) 427-9456, FAX (770) 427-1907

July 25, 1996

Mr. Timothy A. Bent, CPG
Bridgestone / Firestone, Inc.
50 Century Boulevard
Nashville, Tennessee 37214

Subject: **Remedial Action Plan for the Ground-Water Collection System**
Firestone Tire & Rubber Company Site; Albany, Georgia
ATEC Project 32-07-96-00156

Dear Mr. Bent:

ATEC Associates, Inc. (ATEC) is pleased to present this Remedial Action (RA) Plan for the ground-water collection system at the Firestone Tire & Rubber Company Site in Albany, Georgia to Bridgestone / Firestone, Inc. (BFS). This RA Plan has been prepared to implement the RA described in the 100% Remedial Design (RD) Report for the Ground-Water Collection System at the Firestone Tire & Rubber Company Site in Albany, Georgia. This plan is substantially consistent with the previously developed draft table of contents and the requirements of the U.S. Environmental Protection Agency's (USEPA) Statement of Work (SOW). This plan has been prepared to implement portions of the remedy for the site described in the Record of Decision (ROD) in accordance with the Administrative Order by Consent (AOC) between the USEPA and BFS.

We appreciate the opportunity to provide environmental consulting services to BFS. If you have any questions or comments, please call Stephen Wilson or Earl Scott at (770) 427-9456.

Sincerely,

ATEC Associates, Inc.

Stephen K. Wilson, P.G.
Project Manager

Earl H. Scott, P.G.
Project Director

cc: Stephen C. Jones - Jones, Day, Reavis & Pogue
Jane A. Moore - Bridgestone/Firestone, Inc.

REMEDIAL ACTION PLAN
FOR THE
GROUND-WATER COLLECTION SYSTEM

FIRESTONE TIRE & RUBBER COMPANY SITE
ALBANY, DOUGHERTY COUNTY, GEORGIA

Prepared for:

BRIDGESTONE/FIRESTONE INC.

Nashville, Tennessee

ATEC Associates, Inc.

Marietta, Georgia

July 25, 1996

Project 32-07-96-00156

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1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

The Firestone Tire & Rubber Company Site is located in Dougherty County at 3300 Sylvester Road, approximately four miles east of Albany, Georgia. The facility, which encompasses 329.2 acres, is owned by the Albany-Dougherty Payroll Development Authority and was leased to the Firestone Tire & Rubber Company from 1968 to 1990. Pneumatic tires were manufactured at the facility from 1968 until 1986, when Firestone Tire & Rubber Company ceased operations.

In preparation for cessation of operations in 1986, Firestone performed initial assessment activities in 1985. Based on the results of these initial assessment activities, Firestone conducted several interim remedial activities including installation and operation of an interim ground-water collection and treatment system.

After a June 1988 Site Inspection, the United States Environmental Protection Agency (USEPA) proposed including the facility on the National Priorities List (NPL) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In October 1989, the site was listed on the NPL, and Bridgestone/Firestone, Inc. (BFS) subsequently entered into an Administrative Order by Consent with USEPA in 1990.

A Remedial Investigation/Feasibility Study (RI/FS) was conducted by BFS in accordance with the Administrative Order, and, on June 23, 1993, a Record of Decision (ROD) was issued by USEPA stipulating the selected Remedial Action (RA) for the site. In 1994, a Consent Decree was signed by BFS to conduct RD and RA at the site.

In 1995, BFS conducted design activities for the purpose of preparing a Remedial Design (RD) Report. Based on data obtained during these RD activities, USEPA issued an Explanation of Significant Difference (ESD) in March 1996. The 100% RD Report (LAW 1996) was issued on April 19, 1996 and approved by USEPA on June 28, 1996.

1.2 PURPOSE OF THE REMEDIAL ACTION PLAN

This RA Plan has been prepared to implement the Remedial Action described in the 100% Remedial Design Report for the ground-water collection system at the Firestone Tire & Rubber Company Site in Albany, Georgia. This plan is substantially consistent with the Statement of Work (SOW) and the previously developed draft table of contents. This RA Plan is being submitted within one month of USEPA approval of the 100% Remedial Design Report in accordance with a verbal agreement with the USEPA. The following are included in this RA Plan:

- a ground-water remedial action work plan including:
  - description of each of the tasks to be performed for the installation of the ground-water collection system;
  - a description of the work products to be submitted to USEPA;
  - schedules for implementation of the RA Plan and submission of the required deliverables;
- a project management plan with provisions for monthly progress reports to USEPA during implementation of the Plan and meetings / presentations to USEPA at the conclusion of the RA;
- the community relations plan, which is in accordance with the 1994 Consent Decree, is briefly described in Section 2.3;
- a Project Delivery Strategy which addresses the management approach to implementing the RA, including procurement methods, contracting strategy, and contractor and equipment availability concerns;
- a Construction Management Plan which describes how construction activities are to be implemented and coordinated with USEPA during the RA, and how construction changes will be reviewed and approved by USEPA;
- the Construction Management Plan will also designate the RA Coordinator, describe other RA Team personnel, responsibilities, lines of communication and authority;
- a Construction Quality Assurance Plan which describes the management, documentation, procedures, and materials to be used in the construction of the ground-water collection system; and

- a Construction Health and Safety Plan.

The Project Delivery Strategy and the Construction Management Plan are included as sections of this RA Plan document. The Construction Quality Assurance Plan is presented as Appendix A of the RA Plan.

2.0 GROUND-WATER REMEDIAL ACTION WORK PLAN

The ground-water remedial action work plan includes the scope of work to be performed in the RA, the schedule for the RA, a project management plan, a data management plan, and, if requested by USEPA, a community relations plan.

2.1 REMEDIAL ACTION SCOPE OF WORK

The tasks to be performed during implementation of the RA are modifications to the existing ground-water collection system. Details of the ground-water collection system modifications are presented in the Design Specifications (Appendix A) of the 100% RD Report (LAW 1996). The existing interim ground-water collection system at the site requires modification to meet the specifications for the final Remedial Design presented in the 100% RD Report. These modifications include demolition of portions of the existing ground-water collection system, inspection of the remaining existing equipment, and installation of additional equipment for the final ground-water collection system.

The existing ground-water collection system is composed of two ground-water recovery wells (PTW-1 and MW-1-3) with submersible pumps, and an associated air-sparging system. The recovery wells are connected to the air-sparging system by subsurface piping. The air-sparging system includes a storage tank, blower, and associated electrical systems and controls. Subsurface piping also connects the air-sparging system to a discharge manhole, where effluent is discharged to the POTW.

2.1.1 Demolition and Removal

Equipment from three areas of the ground-water remedial action system will be demolished and removed during implementation of the RA. These areas are:

- the piping between ground-water recovery wells PTW-1 and MW-1-3 and the air sparging tank;
- the air sparging system, including the fiberglass storage tank, blower, and associated electrical systems and controls; and,

- the discharge piping between the air sparging tank and the discharge manhole.

This equipment will be demolished and removed in accordance with the Specifications presented in the 100% Remedial Design Report.

2.1.2 Inspection of Existing Equipment

The two existing recovery pumps and pulse sending units (in recovery wells PTW-1 and MW-1-3), controller, air compressor, air dryer, air filters, and appurtenances will be inspected in accordance with the Specifications presented in the 100% Remedial Design Report. Equipment which does not meet the specifications in the RD will be repaired or replaced, as necessary, with equipment which meets these specifications.

2.1.3 Modification of Existing Equipment

After demolition and removal of unneeded portions of the interim ground-water collection system, and inspection of the remaining portions of the system, modifications and additions will be made to the remaining equipment. These modifications include:

- alteration of the four recovery well heads to elevations below grade, and installation of recovery well vault boxes;
- installation of recovery well pumps in wells MW-1-2 and MW-1-1;
- installation of pump controllers for wells MW-1-2 and MW-1-1;
- installation of flow counters to the four recovery well controllers to count pump pulses, and modification of the recovery well controllers to operate the flow counters at the control panel;
- installation of a well sampling port in recovery well PTW-1;
- trenching, installation, and backfilling of subsurface recovery well piping to connect the four recovery wells to the control room;
- modification of the piping and controls in the control room to accept the contingent granular activated carbon units;

- installation of an effluent sampling port in the control room for each recovery well; and,
- trenching, installation, and backfilling of subsurface effluent discharge piping to connect the control room with the discharge to the POTW.

These activities will be performed in accordance with the Specifications presented in Appendix A of the 100% Remedial Design Report.

2.1.4 Post-Construction Activities

The scope of work for the Ground-Water Remedial Action Work Plan encompasses construction activities and associated reporting. Activities scheduled or performed after completion of the construction modifications to the ground-water collection system, such as baseline ground-water quality sampling, system activation, ground-water quality monitoring, compliance monitoring and effluent monitoring will be implemented as specified in the Performance Standards Verification Plan (Appendix D of the 100% RD Report). An Operations and Maintenance (O & M) manual will also be prepared after completion of the construction modifications to the ground-water collection system.

2.2 PROJECT MANAGEMENT PLAN

The Project Management Plan describes the project management team, which will be responsible for implementing the RA Plan, the schedule for implementing the RA Plan, monthly progress reports on the status of the RA, the preconstruction conference call, the prefinal / final construction inspection, and the Final Construction Report.

2.2.1 Project Management Team

The RA Plan will be implemented by the project management team, which is illustrated on Figure 1. The roles and responsibilities of the project management team are defined as follows:

Project Director

The role of the project director will be to provide technical and regulatory strategy for the RA activities at the Firestone Tire & Rubber Company site. He will also work closely with the project manager to provide project guidance to the Project Engineer and the construction Contractor. He will share responsibility with the project manager as primary contact with BFS.

Project Manager

The project manager will be responsible for the daily management of all aspects of the project, including implementation of the Remedial Action Plan and the Construction Quality Assurance Plan. He will also be responsible for coordinating the RA implementation with USEPA, including initiating the preconstruction conference call, preparing the monthly project progress reports (Section 2.2.4), and coordinating the prefinal and final construction inspection. Further, he will be responsible for coordination of the activities of project team members, support staff, and construction contractors. He will share responsibility of primary contact with BFS with the project director.

The roles and responsibilities of the Quality Assurance Engineer, the Project Engineer, and the On-Site Remedial Action Coordinator will be described in Section 4.1 (Construction Management Team).

2.2.2 Schedule

2.2.2.1 Implementation of Remedial Action

The schedule for implementation of the Remedial Action (modification of the ground-water collection system) construction activities is presented on Figure 2.

2.2.2.2 Completion of Remedial Action

The requirements for the completion of Remedial Action are described in detail in the Performance Standards Verification Plan. In general, the Remedial Action will be considered complete after three consecutive years of sampling resulting in concentrations which do not exceed ROD-specified clean-up levels in the recovery and compliance wells.

2.2.2.3 Post-Remedial Action Activities

The activities required after completion of the Remedial Action are described in the Performance Standards Verification Plan. Generally, post remedial action ground-water monitoring will occur five years after completion of the remedial action. Ground-water samples will be collected from the four collection system wells and seven compliance monitoring wells and analyzed for the three ROD-specified constituents of concern. If, after five years, the ground-water samples do not indicate constituents of concern above ROD-specified clean-up levels, the wells will be abandoned in accordance with state requirements.

2.2.3 Preconstruction Conference Call

Prior to initiation of construction activities, a preconstruction conference call will be held between representatives of BFS and USEPA. The purpose of the call will be to:

- Review the roles and responsibilities of the parties;
- Review the methods for documentation and reporting of construction inspection data;
- Review the methods for distributing and storing documents and reports;
- Review work area security and safety measures;
- Review the construction schedule; and,
- Establish a date for a preconstruction site visit, if requested by USEPA.

This conference call will occur approximately two weeks prior to the planned date of implementation. Construction activities will begin on the planned date, or, if necessary, an alternate

date set during the conference call. Because the anticipated schedule for construction is approximately three weeks, a prefinal construction inspection date will also be tentatively set during the preconstruction conference call.

2.2.4 Monthly Status Reports

A brief report will be prepared each month which summarizes the actions taken during implementation of the Remedial Action Work Plan in the preceding month. These reports will also outline sampling results, submittal of deliverables, impending planned activities, delays encountered, schedule modifications, and community relations plan activities. These reports will be submitted to USEPA on the ninth day of each month.

2.2.5 Prefinal / Final Construction Inspection

Because of the short duration of the construction (approximately three weeks) and the small scale of the construction project, we anticipate that the prefinal construction inspection and the final construction inspection will be conducted simultaneously. The prefinal construction inspection date will be confirmed by telephone, facsimile, and / or written communication approximately one week prior to the inspection date. The prefinal construction inspection will consist of a site walk-through and an operational test of the ground-water collection system. Participants in the inspection may include representatives of BFS, the Project Director, the Project Engineer, the Project Manager, USEPA's Remediation Project Manager (RPM), EPD's site manager, the construction contractor, representatives of the current site owner, and representatives of the local POTW. If construction or operational deficiencies are not observed during the prefinal inspection, then the prefinal inspection will also be considered the final construction inspection.

If construction or operational deficiencies are noted during the prefinal construction inspection, a Prefinal Construction Inspection Report will be prepared and submitted to USEPA. This brief report will outline construction and / or operational deficiencies, appropriate actions to be taken, anticipated completion dates, and, if necessary, a tentative date for a final construction inspection.

2.2.6 Final Construction Report

A Final Construction Report will be prepared after completion of the final construction inspection. This report will include:

- A brief description of the resolution of deficiencies identified in the Prefinal Construction Inspection Report;
- An explanation of modifications, if any, made during the RA construction to the design presented in the 100% RD Report;
- As-built drawings of the ground-water collection system;
- A summary of the construction work defined in the SOW; and,
- A certification that the construction work has been completed.

This report will be submitted approximately one month after completion of construction.

2.3 COMMUNITY RELATIONS PLAN

The purpose of the community relations plan, as provided in the Consent Decree, is to present the public and interested parties with information on the Remedial Action at the site. The USEPA maintains an information repository at the Dougherty Public Library in the Albany, Georgia as part of their community relations plan. The repository contains information on the Firestone Tire & Rubber Company Site. The address of the repository is:

Dougherty Public Library
300 Pine Avenue
Albany, Georgia 31701

Information is also available at the USEPA Region IV office in Atlanta, Georgia:

Betty Winter, Community Relations
South Superfund Remedial Branch
EPA
345 ~~Courtland Street, N.E.~~ 100 ALABAMA ST
Atlanta, Georgia ~~30365~~ 30303
~~(800) 435-9234~~ 404 562 - 89

3.0 PROJECT DELIVERY STRATEGY

The objective of the project delivery strategy is to describe the management approach for implementing the RA (including procurement methods and contracting strategy, phasing alternatives, and contractor and equipment availability concerns)

3.1 EQUIPMENT PROCUREMENT

The Remedial Design incorporates the use of new and existing equipment into the final ground-water collection system. New equipment or material for the RA will be procured by the Contractor prior to or during construction activities. Existing equipment will be inspected to the extent practicable (Section 2.1.2), and repaired or replaced if necessary according to the Design Specifications presented in Appendix A of the RD Report (LAW 1996).

3.2 CONTRACTING STRATEGY

3.2.1 Contracting Method

The Contractor will be selected by one of the following methods:

- soliciting bids from qualified potential construction contractors (Contractor) and selecting the Contractor from the bidders; or,
- sole-sourcing the project to a qualified potential Contractor.

Regardless of the selection method utilized, a bid package will be prepared and submitted to the potential Contractor(s).

3.2.2 Bid Preparation and Solicitation

Bid packages for solicitation from potential contractors will be prepared by BFS using a slightly modified version of the bid form presented in Appendix A (Design Specifications) of the 100% RD Report. The bid form will be modified so that the bid will be submitted to BFS for evaluation and

eventual Contractor selection. The bid form includes a total bid price and a breakdown of the components of the price. In addition to the bid form, the bid package will also contain the Design Specifications (Appendix A of the 100% RD Report) for the construction work to be performed.

Upon completion, the bid packages will be issued to the potential Contractors. The Contractor will be required to submit the completed bid form within the time frame specified in a cover letter attached to the package.

3.2.3 Bid Review and Contractor Selection

BFS will review the bids received before the deadline. The bids will be reviewed for:

- overall qualifications to perform the scope of work which was bid;
- experience with similar remediation construction projects;
- experience in the Albany, Georgia area;
- bid price and price of individual tasks in bid; and,
- proposed contractor project management team.

Based on the review of the bids, BFS will select the Contractor.

3.3 PHASING ALTERNATIVES

This section is not applicable.

3.4 AVAILABILITY CONCERNS

3.4.1 Equipment

3.4.1.1 Ground-Water Collection System

The ground-water collection system equipment specified in the RD is readily available; therefore, the availability of equipment is not a significant concern.

3.4.1.2 Contingent Granular Activated Carbon (GAC) Treatment System

Installation of two GAC units into the system may become necessary at some point during the RA if the concentrations of constituents in the effluent from the ground-water collection system exceed the POTW discharge limits. The ground-water collection system is designed for installation of two of the GAC units, if necessary. The GAC units specified in Appendix A of the 100% RD Report were selected based on relative availability in the event that installation is necessary. Currently, the timeframe anticipated to order and install the specified GAC units is 7 to 10 days.

3.4.2 Contractor

The construction activities required by the RD and RA are not unique to this site and are not complex in comparison to most NPL sites. If, for some reason, the Contractor selected cannot implement the RA construction, the simplicity of the RA construction should allow another Contractor to be selected. Also, the estimated schedule for the implementation of the RA construction is of relatively short duration (approximately three weeks; Section 2.2.2), which should allow the Contractor to focus on this project during its implementation. Based on these factors, the availability of the Contractor is also not of significant concern.

4.0 CONSTRUCTION MANAGEMENT PLAN

The purpose of the Construction Management Plan is to describe how RA construction will be implemented and coordinated with USEPA, and how construction changes will be approved.

4.1 CONSTRUCTION MANAGEMENT TEAM

The Construction Management Plan will be implemented by the construction management team. The team is substantially the same as the project management team (Section 2.2.1) with the addition of the Quality Assurance Engineer, the Project Engineer, and the On-Site Remedial Action Coordinator. The roles and responsibilities of the team are defined as follows:

Project Director

The role of the project director will be to provide technical and regulatory strategy for the RA activities at the Firestone Tire & Rubber Company site. He will also work closely with the project manager to provide project guidance to the engineer and the construction Contractor. He will share responsibility with the project manager as primary contact with BFS.

Project Manager

The project manager will be responsible for the daily management of all aspects of the project, including implementation of the Remedial Action Plan. He will also be responsible for coordinating the RA implementation with USEPA, including initiating the preconstruction conference call, preparing the monthly project progress reports, and coordinating the prefinal and final construction inspection. Further, he will be responsible for coordination of the activities of project team members, support staff, and construction contractors. He will share responsibility of primary contact with BFS with the project director.

Quality Assurance Engineer

The Quality Assurance (QA) Engineer is independent from the Project Director, Project Manager, Project Engineer, Contractor, and Contractor's construction team. The QA Engineer may be from the same firm as the Project Manager and Project Director, a different engineering firm, or a representative of BFS. The management, coordination, and implementation of the construction quality assurance activities specified in the Construction Quality Assurance Plan (CQAP) in Appendix A are the responsibilities of the QA Engineer. The QA Engineer will report CQA findings to the Project Manager and Project Director (Figure 1).

Project Engineer

The Project Engineer will be a Georgia-registered professional engineer responsible for oversight of construction of the ground-water collection system in accordance with the Design Specifications (Appendix A of the 100% RD Report). Responsibilities of the Project Engineer also include oversight of the on-site Remedial Action Coordinator, preparation of the As-Built Diagrams for the Final Construction Report, and providing professional engineer certification of appropriate RA activities, as necessary. The Project Engineer will report to the Project Manager (Figure 1).

On-Site Remedial Action Coordinator

The On-Site Remedial Action Coordinator will provide oversight of the RA activities. Responsibilities for this position will include, but not be limited to, maintaining written and photographic documentation of daily construction activities, implementing the site-specific health and safety plan, maintaining regular briefings with the Project Engineer, documenting construction delays encountered, and maintaining daily coordination of construction activities with the Contractor's Site Manager. The Remedial Action Coordinator will report to the Project Engineer (Figure 1).

4.2 CONTRACTOR'S CONSTRUCTION TEAM

The Contractor is responsible for construction of the final ground-water collection system and will be chosen in accordance with the Contracting Strategy (Section 3.2). The Contractor will provide a construction team to implement the demolition and construction activities described in the Scope of Work of the Ground-Water Remedial Action Work Plan (Section 2.1). This construction team will be supervised by a Contractor's Project Manager and a Contractor's Site Manager. The roles and responsibilities of these positions are defined as follows:

Contractor's Project Manager

The Contractor's Project Manager will be responsible for the managing all aspects of the construction for the Contractor. These responsibilities may include, but not be limited to, oversight of the Contractor's Site Manager (Figure 1), quality assurance and quality control for the Contractor, budget maintenance for the Contractor, maintaining the construction schedule, and purchasing equipment and supplies needed for the construction and demolition activities. The Contractor's Project Manager will also be responsible for maintaining communication with (ATEC's) Project Manger.

Contractor's Site Manager

The Contractor's Site Manager will be responsible for the daily activities of construction for the Contractor. These responsibilities may include, but not be limited to, documentation of daily activities, progress reports to the Contractor's Project Manager, oversight of other members of the Contractor's construction team, and implementation of the Contractor's Health & Safety Plan. The Site Manager will also be responsible for maintaining communication with the Project Engineer and the On-Site Remedial Action Coordinator (Figure 1).

4.3 CONSTRUCTION COORDINATION WITH AGENCIES

Construction will be coordinated with the USEPA through a series of conference calls, meetings, inspections, and reports. Prior to initiation of construction activities, a preconstruction conference call will be held between BFS and USEPA (Section 2.2.3). This conference call will occur approximately two weeks prior to the planned date of implementation. USEPA and Georgia EPD will be updated on the progress of the RA through the monthly progress reports (Section 2.2.4).

After completion of the construction activities coordination will continue with the scheduled prefinal/ final construction inspection with representatives of USEPA and others (Section 2.2.5). If necessary, a Prefinal Construction Inspection Report will be prepared and a final construction inspection date scheduled. Upon completion of the final construction inspection, or USEPA's acceptance of the prefinal inspection as the final inspection, a Final Construction Report will be prepared and issued to USEPA.

4.4 APPROVAL OF CONSTRUCTION CHANGES

4.4.1 Engineer or Contractor Construction Changes

Construction changes will be approved according to the procedure presented in Section 1035 of the Design Specifications in Appendix A of the 100% RD Report.

4.4.1 Agency Approval of Construction Changes

Because of the short duration and simplicity of the Remedial Action, significant construction changes requiring agency approval are not anticipated. Construction changes which exceed design criteria will be reviewed and approved by the Engineer and the Project Manager. These changes will be identified and explained in the Final Construction Inspection Report.

5.0 CONSTRUCTION HEALTH AND SAFETY PLAN

The construction health and safety plan for the RA activities will be based on the existing Health and Safety Plan (LAW 1994) for the RD activities at the site. The construction health and safety plan will incorporate minor modifications as follows:

- Construction activities (e.g. demolition and excavation) will be included into a Physical Hazards subsection of Section 4.0 (Expanding the Site Surveillance and Field Implementation of the Plan);
- Section 6.0 (Personnel Training) will be altered to reflect ATEC's training methods;
- Emergency contacts and telephone numbers in Section 9.0 (Emergency Procedures) will be updated; and,
- Section 10.0 (Medical Monitoring Program) will be altered to reflect ATEC's program.

6.0 CONSTRUCTION QUALITY ASSURANCE PLAN

The Construction Quality Assurance Plan is presented in Appendix A.

7.0 REFERENCES

LAW 1996, *100% Remedial Design Report for the Ground-Water Collection System*, Firestone Tire & Rubber Company Superfund Site, Albany, Georgia. Law Engineering and Environmental Services, Kennesaw, Georgia, April 19, 1996.

LAW 1994, *Health and Safety Plan*, Firestone Tire & Rubber Company Superfund Site, Albany, Georgia. Law Environmental, Inc., Kennesaw, Georgia, April 1994.

FIGURES

PROJECT AND CONSTRUCTION MANAGEMENT TEAM

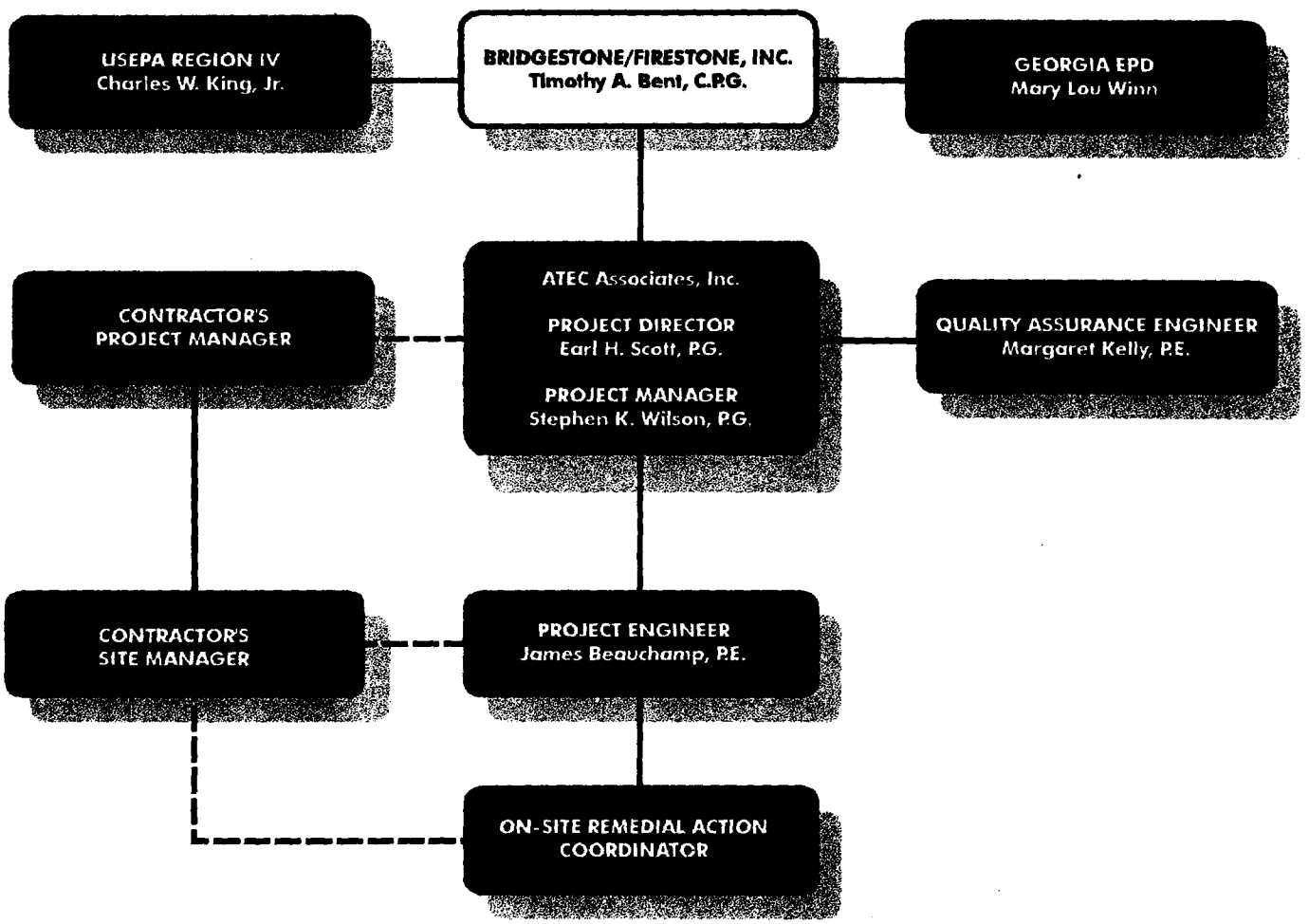
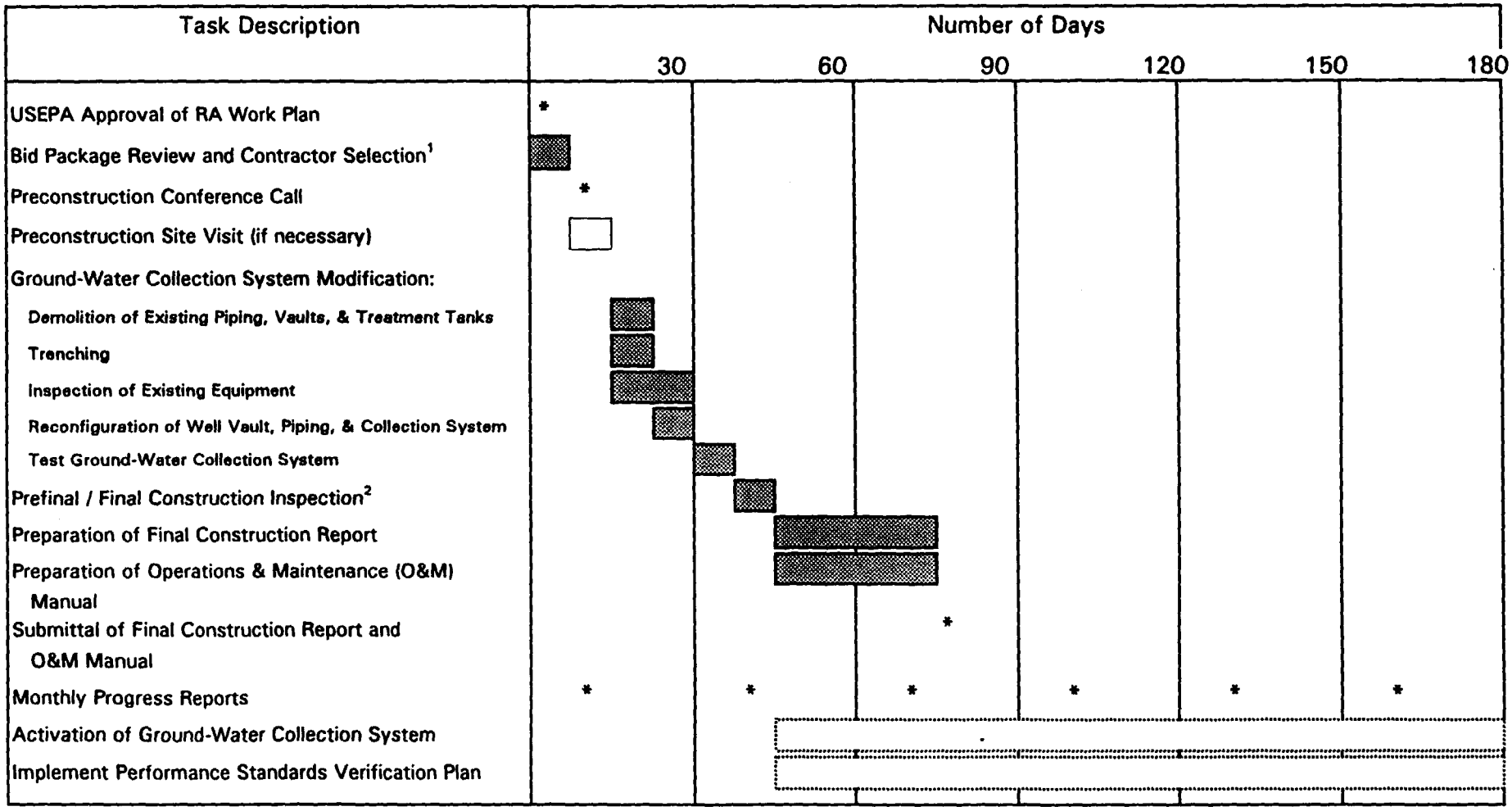


FIGURE 2
SCHEDULE OF IMPLEMENTATION
FIRESTONE TIRE & RUBBER COMPANY SUPERFUND SITE, ALBANY, GEORGIA
ATEC PROJECT 32-07-96-00156



Note:
1) Schedule for Contractor selection is predicated on the assumption that bid packages will have been submitted to potential contractors and returned by the potential contractors to BFS for review prior to USEPA approval of the Remedial Action Plan for the Ground-Water Collection System.
2) If deficiencies are noted during the Prefinal Inspection, a Prefinal Construction Inspection Report will be prepared and submitted to USEPA. A Final Construction Inspection will then be scheduled.

PREPARED BY/DATE SKW 7/25/96
CHECKED BY/DATE

APPENDIX A

CONSTRUCTION QUALITY ASSURANCE PLAN

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A1.0 INTRODUCTION

A1.1 Objective and Background

The objective of this Construction Quality Assurance Plan (CQAP) will be to document activities and procedures necessary to construct the ground-water collection system at the Firestone Tire and Rubber Company Site in Albany, Dougherty County, Georgia pursuant to the Consent Decree (1994) and as required by the USEPA's Statement of Work (SOW) in the June 24, 1993 Record of Decision (ROD). The CQAP outlines quality assurance procedures to be employed during construction of the system outlined in the *100% Final Ground-Water Remedial Design Report for the Ground-Water Collection System* (LAW, April 19, 1996).

A1.2 Management

The following section of this plan addresses the responsibilities of the project members with respect to Quality Control (QC) and Quality Assurance (QA). This section of the plan also includes a definition of the terminology used in addressing matters concerning construction quality.

A1.2.1 Functions of CQA Personnel

The function of the Construction Quality Assurance (CQA) personnel is to provide inspection of Contractor's construction activities and verify compliance with the Design Specifications. The CQA personnel shall test materials, make visual observations assuring the quality of materials and work, provide quality assurance documentation and report any materials or work failing to meet the standards established by the Design Specifications.

A1.2.2 Quality Control and Quality Assurance

A1.2.2.1 Quality Control

Quality Control is the responsibility of the Contractor. Quality Control concerns procedures and controls established by the Contractor within his organization to produce the quality of work and materials required in the Design Specifications.

A1.2.2.2 Quality Assurance

Quality Assurance is a function of the Engineer. It is the responsibility of the CQA personnel to check the work and materials of the Contractor for conformance with the Design Specifications.

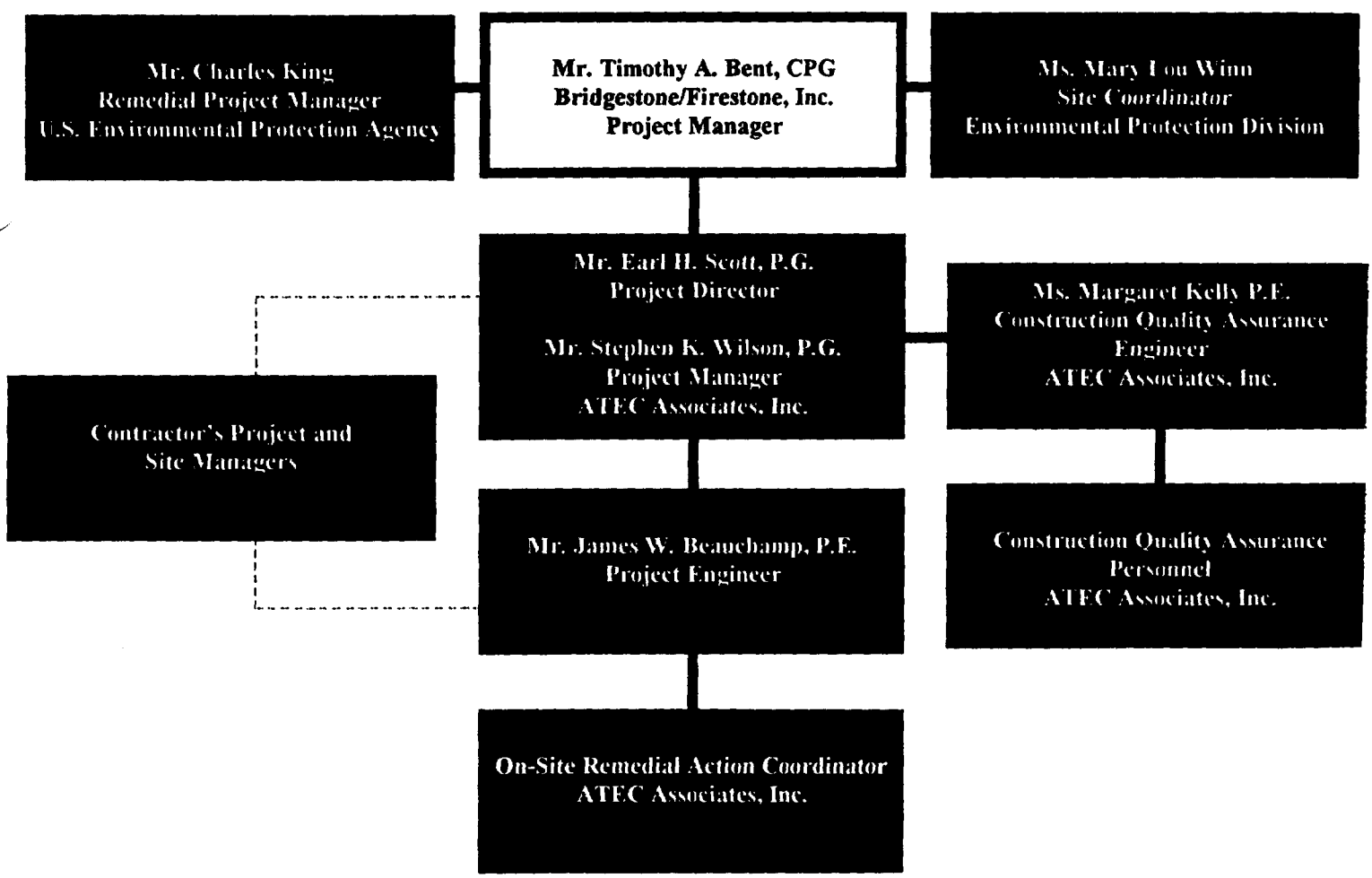
A1.2.3 Relationship of On-Site RAC and CQA Personnel

The CQA personnel shall act independently of the On-Site Remedial Action Coordinator (RAC). The CQA Engineer shall report to the Project Manager. The CQA personnel shall act independently of the Contractor and the Contractor's subcontractors.

A1.2.4 Organization Chart

A typical organization chart indicating key project members is presented below.

PROJECT AND CONSTRUCTION MANAGEMENT TEAM



A1.2.5 Responsibilities

A1.2.5.1 The Project Management Team

The project management team for the Remedial Action (RA) will consist of a Project Director, a Project Manager and Project Engineer. These individuals will be responsible for coordination of all project activities and will work closely with the Bridgestone/Firestone, Inc. (BFS) project manager to assure and control the quality of the construction project.

The Project Director will be **Mr. Earl H. Scott, P.G.** He will be responsible for the following:

- Provide technical and regulatory strategy for the RA activities.
- Act as a primary point of contact between ATEC, BFS and USEPA on QA/QC issues during construction.
- Work closely with the Project Manager to affect efficient coordination of construction activities.

The Project Manager for this project will be **Mr. Stephen K. Wilson, P.G**. He will be responsible for the following:

- Field, analytical, subcontracting, and health and safety activities for the project.
- Periodic review of CQA reports.
- Modify construction site activity.
- Approval of corrective measures in cases where deviation from the specified design or failure to meet design specifications as detected by the CQA personnel.

The Project Engineer is **Mr. James W. Beauchamp, P.E.** He will be responsible for the following:

- Coordinate with the Project Management team and CQA Engineer to obtain adequate information necessary to certify completion of the RA.
- Review of contractor submittals and performance of site visits on an as-needed basis to review construction techniques and progress

A1.2.5.2 The Construction Quality Assurance Engineer

The Construction Quality Assurance (CQA) Engineer will have primary responsibility for assuring that the construction of the ground-water collection system is performed in accordance with the Design Specifications and Design Drawings in the 100% RD Report (LAW, 1996) as necessary for the Project Engineer to certify completion of the RA. This will be accomplished through implementation of the CQA Plan and designation of other qualified CQA personnel (Section A1.5.3).

The CQA Engineer will be **Ms. Margaret Kelly, P.E.** She will be responsible for the following:

- Implementation of the site specific CQAP.
- Review design drawings and specifications for clarity and completeness.
- Schedule third party testing for quality assurance testing.
- Direct and support the CQA personnel in performing observations and tests by:
  - Confirming that the testing equipment, personnel, and procedures do not change over time or verifying that any changes do not result in a deterioration of the inspection process.
  - Confirming that the test data are accurately recorded and maintained.
  - Verifying that the raw data are properly summarized and interpreted.
- Provide the Project Manager periodic reports on the inspection results including:
  - Reviews and interpretations of observation records and test results.
  - Identification of the work that the CQA Engineer believes should be accepted, rejected, uncovered for observation or that may require special testing, inspection or approval.
  - Reports of rejected work and/or materials.
- Verify implementation of and adherence to the Contractor's construction quality control plan.
- The CQA Engineer shall report all findings to the Project Manager. The Project Manager shall decide what action, if any, is to be taken.

A1.2.5.3 Construction Quality Assurance (CQA) Personnel

Responsibilities include:

- Verify that the contractor's independent testing company's testing equipment meets the test parameters and that the tests are performed by qualified personnel according to the standardized procedures defined in the Design Specifications.

- Observe tests performed to verify compliance of materials and workmanship with the standards established in the Design Specifications.

- Perform independent on-site testing and observation of the work in progress to assess compliance by the Contractor with the Design Specifications. Testing shall be performed using the standardized procedures defined in this CQAP and the Design Specifications.

- Report to the CQA Engineer results of all observations and tests as the work progresses.

- Report to the CQA Engineer results of all inspections including work and materials that are not of acceptable quality or fails to meet the specified design. The report shall be made using the "Deficiency Identification Report" defined in Section 2.0, CQAP.

- The CQA personnel shall not direct or suggest corrective action to the contractor for any construction activity.

A1.2.5.4 The Contractor

- It is the responsibility of the Contractor to provide personnel, materials, direction and quality control for the construction of the work in strict accordance with the Design Specifications, Work Plan, Drawings, or other Contract Documents using the appropriate construction procedures and techniques.

- Contractor shall provide an approved independent testing company using qualified personnel to ensure conformance with the Design Specifications.

A1.3 Remedy Procedure

Corrective measures shall be implemented when observations or tests indicate that the Contractor's work does not meet the standards established by the Design Specifications.

A1.3.1 Materials and Work Subject to 100 Percent Inspection

For materials or work procedures subject to 100 percent inspection, such as piping installation, substandard material shall be rejected and replaced. Substandard work procedures will be reworked until they meet the standards established in the Design Specifications.

A1.3.2 Other Work and Materials

For work or materials inspected in blocks, sections or in unit intervals, rejection of any material or workmanship on the basis of observation, testing, laboratory analyses, mill testing or manufacturer's certification shall be corrected in the following manner, except where specified by the Project Manager.

- If materials or work fail to meet the standards established in the Design Specifications then the failure shall be reported to the CQA Engineer by the CQA personnel, independent testing company or independent laboratory. The CQA Engineer shall decide if the testing method is valid. The CQA Engineer shall report the results of the testing and validity of the testing methods to the Project Manager.

- The Project Manager shall decide what action is to be taken. The Project Manager may decide to require the work or materials to be replaced or reworked; retested; other action to be determined by the Project Manager; OR that no action is to be taken.

- If the material or work is retested and the second test(s) fails, the material or work will be rejected. The Contractor can remove the material or work and replace or rework the material or work in place to bring it up to meet the design criteria in the Design Specifications, and retest. The results of the second test shall be reported to the Project Manager for a decision of action if the second test passes.

- If the material or work still fails, the RAC shall require the Contractor to remove the material or work and replace it. The new material or work shall be tested to insure compliance with the Design Specifications.

The CQA Engineer shall report material or work deficiency to the Project Manager. The Project Manager shall specify corrective action to be taken. The On-Site Remedial Action Coordinator shall implement the corrective action specified by the Project Manager.

The Contractor shall be required to suggest or propose a plan correct deficient work or materials to the Project Manager through the RAC. The suggested corrective action shall be attached to

the Deficiency Identification Report. Contractor appeals shall be attached to the Deficiency Identification Report.

A2.0 DOCUMENTATION

QA documentation will take the form of a series of reports. The CQA Engineer will be responsible for maintaining all CQA records. Copies of all CQA reports will be provided to the BFS Project Manager and to USEPA.

A2.1 Method of Reporting

A2.1.1 Daily Summary Report

The daily summary report shall be prepared by the CQA Engineer or CQA Personnel at the direction of the CQA Engineer. At a minimum the summary report should include the following:

- Unique identifying report number for cross referencing and document control.
- Date, project name, project number, task number, location, and other pertinent information.
- Data on weather conditions.
- Report on meetings that pertain to quality assurance.
- Brief description of construction activities - location, description of activity, and construction progress.
- Description of Contractor's independent laboratory testing. Should include name of testing company, type of testing, number of samples, description of split sampling (where appropriate), location of sampling, and other pertinent observations.
- Description of quality assurance activities.
- Description of off-site materials received, including quality verification documentation.
- Calibration, or recalibrations, of test equipment, including action taken as a result of calibration.
- Decisions made regarding approval of work or materials and/or corrective action recommended for substandard work or materials.
- Reference to supporting documentation shall include a unique identifying number for document control.

- Signature of the CQA personnel and CQA Engineer.

A2.1.2 Quality Assurance (QA) Activity Report

The QA data sheet shall be completed for all field observations, field testing, and laboratory testing. Work activities shall be described as a construction activity outlined in Section 3.0, Procedures and Materials of this CQAP. Trenching, Compaction, Piping, Recovery Vault Construction and Inspection of Existing Equipment are all examples of a work activity. Construction activity and work activity are synonymous in this CQAP. At a minimum, each work activity will require a unique data sheet with the following information:

- Unique identifying sheet number for cross referencing and document control.
- Date, project name, project number, task number, and other pertinent information.
- Description or title of QA activity.
- Location of observation or location of where sample was taken.
- Batch or increment number for sample taken.
- Unique sample number.
- Type of QA activity; procedure used (referenced to applicable standard method when appropriate).
- Recorded observation, measurement, or test data with all calculations.
- Results of the QA activity.
- Personnel involved in the QA activity.
- Signature of the appropriate CQA personnel and concurrence by the CQA Engineer.

A2.1.3 Deficiency Identification Report

A deficiency is defined as material or workmanship that does not meet the standards established in the Design Specifications. Deficiency Identification Reports shall be cross referenced to the

specific QA Activity Report where the deficiency was identified. At a minimum they should include the following information:

- Unique identifying report number for cross referencing and document control.
- Date, project name, project number, task number, and other pertinent information.
- Detailed description of the deficiency.
- Location of the deficiency.
- How and where deficiency was located. Make reference to other QA documentation that may be used for cross-referencing.
- Estimation of how long deficiency has existed.
- Suggested correction action proposed by the Contractor.
- Decision of Project Manager on request for corrective action.
- Description of approved corrective action.
- Documentation of corrective action taken.
- Reference to additional QA activity reports for corrective action, where applicable.
- Final results.
- Suggested methods to prevent similar deficiencies.
- Appeals made by Contractor, if any.
- Project Manager's decision on appeals.
- Signature of the appropriate CQA personnel and concurrence by the CQA Engineer.

A2.1.4 Photographic Reporting Data Sheets

Photographic Reporting Data Sheets shall be cross referenced or appended to QA Activity Reports and/or Deficiency Identification Reports. These photographs will serve as a pictorial

record of work in progress, deficiencies and corrective action. The photographs shall be 4 by 6- or 3 by 5-inch color prints stored in a permanent protective file in the order in which they were taken. Negatives shall be stored in order in a separate file. The Photographic Reporting Data Sheets shall include, at a minimum, the following:

- A unique identifying number on the data sheets and photographs for cross referencing and document control.
- The date, time and location where the photograph was taken.
- Project name, project number and task number.
- The size, scale and orientation of the subject matter photographed.
- Location and description of the work.
- Typed or printed name and signature of the photographer.

A2.1.5 Weekly Summary Report

Weekly Summary Reports shall be made at a weekly frequency unless changed by the Project Manager. At a minimum the report shall include the following:

- A unique identifying number for cross referencing and document control.
- Date, project name, project number, task number, location, and other pertinent information.
- Listing of meetings pertaining to QA activities.
- Summary of construction activities for the summary period.
- Summary of QA activities for the summary period, including observation and test results.
- Summary of Deficiency Identification Reports.
- Summary of work recommended to acceptance and inventory of materials recommended for acceptance.

- Signature of the CQA Engineer.

A2.1.6 Construction Activity Evaluation Report

Within each evaluated construction (or work) activity, there may be several quality characteristics, or parameters, that are specified to be observed or tested, each by a different observation or test, with the observation and/or test recorded on different data reports. At the completion of each construction activity of work, these data reports should be organized into a construction activity evaluation report. These construction activity evaluation reports may then be used to summarize all of the site construction activities.

Construction activity evaluation reports should be prepared by the CQA Engineer and, at a minimum, include the following:

- A unique identifying number for cross referencing and document control.
- Date, project name, project number, task number, location and other pertinent information.
- Description of construction activity (use project coordinate system to identify areas).
- Quality characteristics being evaluated; references to standards established in the Design Specifications and the Work Plan.
- Sampling requirements for the construction activity being evaluated.
- Sample item or test location.
- Observations or tests made (define procedure by name, i.e. ASTM D 422).
- Summary of observation and test results (give construction activity average and standard deviation, if available, for each quality characteristic).
- Define acceptance criteria (compare construction activity evaluation data with the standards established in the Design Specifications; indicate compliance or noncompliance; in the event of noncompliance, identify documentation that gives reasons for acceptance outside of the specified design).
- Signature of the CQA personnel and CQA Engineer.

A2.1.7 Final Construction Quality Assurance Report

At the completion of the project, the CQA Engineering Team shall submit a final report to the Project Manager for initial review. This report shall include all of the Daily Summary Reports, QA Activity Reports, Photographic Reporting Data Sheets, Deficiency Identification Reports, Weekly Summary reports, deviation from the Design Specifications (with justifying documentation) and as built drawings.

After review and approval by the Project Manager and the Project Director, the CQA final report will be submitted to BFS for review and comment.

A2.2 Record Keeping

A2.2.1 Document Control

All CQA documentation shall be maintained under a document control procedure to organize and index for easy cross referencing. Each page of the CQA documentation shall receive an identifier at the top right-hand corner of the page. The identifier shall consist of:

- A three character code identifying the type of document (i.e. DSR = Daily Summary Report).
    - DSR - Daily Summary Report
    - QAA - Quality Assurance Activity Report
    - DIR - Deficiency Identification Report
    - PRD - Photographic Reporting Data Sheets
    - WSR - Weekly Summary Report
    - CAR - Construction Activity Evaluation Report
- A three digit code identifying the report number in chronological order (i.e. 001 - the first report of the document).

A2.2.2 Storage of Records

The CQA Engineer shall be responsible for all CQA documents during the construction phases of the project. This shall include the CQA Engineer's copy of the Design Specifications, the Work Plan, and the Construction Quality Assurance Plan, and the originals of all the data sheets and reports. Duplicated records will be kept at the ATEC Associates, Inc. office in Marietta, Georgia,

to avoid loss of this information if the originals are destroyed. This information will be backed up every 14 calendar days or at the end of the construction or work activity, whichever is sooner.

Once the construction phases of the project are complete, the document originals will be sent to ATEC Associates, Inc., in Marietta, Georgia, where they will be stored in a manner that will allow easy access while still protecting them from damage. An additional copy will be given to the Project Manger to be included with the Final Construction Quality Assurance Report.

A2.3 Lines of Communication

Lines of communication shall be maintained according to the diagram presented in Section 1.2.4 (Project Organization Chart).

A2.3.1 CQA Engineer

All reports, data sheets generated by the CQA personnel, reports, certifications, and data sheets submitted by the Contractor and reports and results submitted by approved independent laboratories shall be reviewed by the CQA Engineer for assurance and completeness. The CQA Engineer shall review the testing method to determine its validity. Reports generated by the CQA Engineer shall be submitted to the Project Manager for review. The CQA Engineer shall submit notice of materials and/or Contractor workmanship deficiency to the Project Manager for his decision of whether the Contractor must submit a proposal for a method of corrective action.

A2.3.2 Project Manager and Director

The Project Manager shall review the Deficiency Identification Report, and shall decide if action by the Contractor is required. The Project Manager will coordinate with the Project Director and then write a decision on the Deficiency Identification Report and deliver it to the RAC. The Project Manager shall review the Contractor's proposals for corrective deficient work and/or materials. If a corrective action procedure suggested by the Contractor is approved by the Project Manager and Project Director then it shall be noted on the Deficiency Identification Report and submitted to the RAC for action by the Contractor. If the suggested corrective action is not approved then the disapproval shall be noted on the Deficiency Identification report and returned to the Contractor for modification and resubmittal. The Project Manager shall review all Contractor appeals and requests for equipment, material or procedure modification. The Project Manager shall have easy access to all reports, data sheets and pertinent information.

A2.3.3 Contractor

The Contractor shall submit requests for equipment, material or procedure modification to the RAC. The Contractor shall be required to propose a method for corrective action on deficient work or materials when requested by the RAC or the Project Manager. The Contractor may appeal the decision of the Project Manager to require corrective action. It shall be the responsibility and expense of the Contractor to provide supporting documentation (i.e. retesting results, etc.) for appeal.

A2.3.4 On-Site Remedial Action Coordinator (RAC)

The RAC shall report directly to the Project Manager. The RAC shall act as liaison between the Contractor and the Project Manager. It shall be the responsibility of the RAC to verify that the Contractor installs the system in a manner (materials and workmanship) which meet the standards established in the Design Specifications.

A2.4 Contractor's Submittals

The CQA Engineer shall maintain a log of all Contractor submittals. These submittals may include:

- Manufacturer's material quality verification sheets.
- Test results from approved independent laboratories.
- Contractor's proposal for corrective action of deficient workmanship or materials.
- Certifications.
- Appeal of corrective action request to Project Manager.

A2.5 Testing Laboratories

The testing laboratories shall be approved by the Project Engineer prior to use. The testing laboratories shall submit test results directly to the CQA Engineer, as requested. The laboratories shall be certified by the appropriate agency to perform required testing. The Contractor shall provide the testing laboratory and shall perform testing and analyses at the Contractor's request.

A2.6 Forms

Forms will be developed after submission of the Remedial Action Work Plan.

A3.0 PROCEDURES AND MATERIALS

A3.1 Demolition

Includes demolition and removal of existing recovery well piping currently installed from wells MW-1-1 and PTW-1 to an existing air sparging tank, removal of existing discharge piping connecting the air sparging tank to the discharge manhole, and removal of the existing air sparging system including the fiberglass storage tank, blower, and associated electrical systems and controls.

A3.1.1 Standards

- Debris shall be decontaminated (if necessary) and removed from the site for proper disposal.
- Local, state and Federal regulations regarding transportation and disposal of solid industrial and hazardous waste shall apply.

A3.1.2 Certification

- Contractor shall furnish certification in writing of any disposal facility's certifications to receive demolition debris.
- Contractor shall furnish certification in writing of transporter's personnel and equipment qualifications and permits.
- Contractor shall provide written documentation of proper disposal of debris (i.e., manifests, disposal certificates, etc.)

A3.1.3 Documentation

- The CQA Engineer shall maintain a daily log of demolition activities.
- The CQA Engineer shall maintain a log of truck load weight, disposal facility and the truck identification number corresponding to each load transported off site.
- The CQA Engineer shall maintain a log of bills of lading or manifests.

A3.1.4 Execution

- The CQA Engineer shall make visual observations for quality assurance.

A3.1.5 Storage

- Debris from the recovery wells, piping and air sparging system shall be staged on-site beyond the exclusion zone in a manner and location approved by the RAC.
- Debris shall be temporarily stockpiled on site only for staging purposes during the demolition phase.

A3.2 Trenching, Backfilling and Compacting

Includes trenching for installation of new recovery well and discharge piping, backfilling of trenches after installation of the new piping and compacting of backfill soil prior to mulching and overseeding in grass areas or asphalting/concreting in paved areas.

A3.2.1 Standards

- Occupational Health and Safety Act (OSHA), 29CFR1926.650, Subpart P, Excavation, Trenching and Shoring.
- OSHA 29CFR1910.
- State of Georgia Specifications for Road and Bridge Construction (Georgia Department of Transportation, 1993 edition)
- Design Specifications (Appendix A of the 100% RD Report, LAW 1996)

A3.2.2 Certification

- Not applicable for trenching.
- Contractor shall furnish report(s) from the laboratory which conducts tests of compacted soils and asphaltic pavements.

A3.2.3 Documentation

- The CQA Engineer shall maintain a log of trenching, backfilling, compacting and paving activities, including material descriptions.
- The CQA Engineer shall maintain a log of field compaction test results and laboratory analyses.
- The CQA Engineer shall maintain a log of backfill thickness, compaction method and equipment used, soil characteristics and location and frequency of tests.
- The CQA Engineer shall maintain a list of asphaltic materials used, materials rejected and a log of Contractor quality control testing.

A3.2.4 Execution

- The CQA Engineer shall make visual observations for quality assurance, including methods of excavation, safety practices of Contractor and composition and disposition of excavated material, backfill soil and asphaltic materials.
- The CQA Engineer shall measure and record the extent of excavation including location, depth, width and length of trenches.
- The CQA Engineer shall maintain a log of excavated debris encountered during excavation activities.
- The Contractor shall perform, or have an independent laboratory perform, the soil characteristics tests on the fill material as prescribed in the Design Specifications (Appendix A of the 100% RD Report) and in the CQAP. The CQA Engineer shall visually observe the collection and testing of soil and/or asphalt samples and/or shall split samples with the Contractor and conduct independent tests as determined by the Project Manager.
- The CQA Engineer shall verify that the Contractor is using the type of excavation, compacting and asphalting equipment in the Design Specifications or approved by the Project Manager and that the Contractor maintains consistent equipment speed, number of passes, uniformity of coverage and compactive effort.
- Compaction tests shall be performed at a rate of one test per 10 feet of linear trench in load-bearing areas (i.e., asphalt driveway) or as approved by the Project Manager.
- Aggregate Base Course and Granular Pavement, Backfill and Final Layer Compaction
  - Verify that the material is compacted to a density of at least 92 percent of the material's maximum dry density as determined by ASTM D698.
  - Field density tests shall be performed using a nuclear densitometer.
  - Proctor Moisture -Density shall be conducted per ASTM D 698 with a minimum of one test per visible change in backfill material

A3.2.5 Storage

- Excavated and backfill material shall be stockpiled in a manner described in the Design Specifications and in a location approved by the RAC.
- Storage is not applicable for compaction.
- Asphaltic materials shall be stored in a manner recommended by the manufacturer and approved by the Project Engineer.

A3.3 Ground-Water Recovery Wells

Includes construction of below-grade recovery well vaults, installation of piping, recovery pumps, pulse sending units and controllers.

A3.3.1 Standards

- Well vaults: AASHTO H-20
- OSHA 29CFR1910.
- Design Specifications (Appendix A of the 100% RD Report, LAW 1996)
- Environmental Compliance Branch Standard Operating Procedure and Quality Assurance Manual, USEPA Region IV (February 1, 1991).

A3.3.2 Certification

- The Contractor shall retain an independent testing laboratory, approved by the Engineer, to determine conformance of all backfill compaction and concrete materials with the Design Specifications.
- Contractor shall furnish report(s) and certificates of material testing from the laboratory which conducts tests of compacted backfill and concrete materials.

A3.3.3 Documentation

- The CQA Engineer shall maintain a log of backfilling and compacting activities, including material descriptions, well vault construction activities, recovery pump model and manufacturer, pump controllers, pump senders and other standards in the Design Specifications.
- The CQA Engineer shall maintain a log of field compaction and concrete test results and laboratory analyses and any other Contractor quality control test results.
- The CQA Engineer shall maintain a log of backfill thickness, compaction method and equipment used, soil characteristics and location and frequency of tests.

A3.3.4 Execution

- The CQA Engineer shall make visual observations for quality assurance in a systematic manner to ensure that the final product is in conformance with the standards established in the Design Specifications.
- The Contractor shall perform, or have an independent laboratory perform, the soil characteristics tests on the fill material as prescribed in the Design Specifications (Appendix A of the 100% RD Report) and in Section 4.5 of the CQAP. The CQA Engineer shall visually observe the collection and testing of soil and concrete samples

and/or shall split samples with the Contractor and conduct independent tests as determined by the Project Manager.

- The CQA Engineer shall verify that the Contractor is using the type of excavation and compacting equipment in the Design Specifications or approved by the Project Manager and that the Contractor maintains consistent equipment speed, number of passes, uniformity of coverage and compactive effort.
- Compaction tests shall be performed at a rate of one test per vault or as approved by the Project Manager.
- Aggregate Base Course and Granular Pavement
  - Verify that the material is compacted to a density of at least 92 percent of the material's maximum dry density as determined by ASTM D 698
  - Field density tests shall be performed using a nuclear densitometer.

A3.3.5 Storage

- Storage is not applicable.

A3.4 Piping, Appurtenances and Compressor

Includes installation of piping and appurtenances in the existing compressor room for the contingent granular activated carbon (GAC) units and inspection and preventative maintenance of existing air compressor, air dryer, air filters and appurtenances.

A3.4.1 Standards

- OSHA 29CFR1910.
- Design Specifications (Appendix A of the 100% RD Report, LAW 1996)
- Environmental Compliance Branch Standard Operating Procedure and Quality Assurance Manual, USEPA Region IV (February 1, 1991).

A3.4.2 Certification

- Not applicable

A3.4.3 Documentation

- The CQA Engineer shall maintain a log of activities, including material descriptions, piping construction activities, and wiring activities in conformance with other standards in the Design Specifications.
- The CQA Engineer shall supply documentation regarding modifications to existing piping and maintenance activities necessary for the air compressor, air dryer, air filter and appurtenances.

A3.4.4 Execution

- The CQA Engineer shall make visual observations for quality assurance in a systematic manner to ensure that the final product is in conformance with the standards established in the Design Specifications.
- The CQA Engineer shall document the final as-built layout of the piping system.

A3.4.5 Storage

- Storage is not applicable.

A3.5 Contingent Granular Activated Carbon System

Includes installation of GAC units if future monitoring of recovered ground water indicates that the discharge effluent concentrations exceed limitations in the system industrial wastewater discharge permit.

A3.5.1 Standards

- Design Specifications (Appendix A of the 100% RD Report, LAW 1996)
- Environmental Compliance Branch Standard Operating Procedure and Quality Assurance Manual, USEPA Region IV (February 1, 1991).

A3.5.2 Certification

- Not applicable.

A3.5.3 Documentation

- The CQA Engineer shall maintain a log of backfilling and compacting activities, including material descriptions, well vault construction activities, recovery pump model and manufacturer, pump controllers, pump senders and other standards in the Design Specifications.
- The CQA Engineer shall maintain a log of field compaction and concrete test results and laboratory analyses and any other Contractor quality control test results.
- The CQA Engineer shall maintain a log of backfill thickness, compaction method and equipment used, soil characteristics and location and frequency of tests.

A3.5.4 Execution

- The CQA Engineer shall make visual observations for quality assurance in a systematic manner to ensure that the final product is in conformance with the standards established in the Design Specifications.
- The Contractor shall perform, or have an independent laboratory perform, the soil characteristics tests on the fill material as prescribed in the Design Specifications (Appendix A of the 100% RD Report) and in Section 4.5 of the CQAP. The CQA Engineer shall visually observe the collection and testing of soil and concrete samples and/or shall split samples with the Contractor and conduct independent tests as determined by the Project Manager.
- The CQA Engineer shall verify that the Contractor is using the type of excavation and compacting equipment in the Design Specifications or approved by the Project Manager and that the Contractor maintains consistent equipment speed, number of passes, uniformity of coverage and compactive effort.
- Compaction tests shall be performed at a rate of one test per vault or as approved by the Project Manager.
- Aggregate Base Course and Granular Pavement
  - Verify that the material is compacted to a density of at least 92 percent of the material's maximum dry density as determined by ASTM D 698
  - Field density tests shall be performed using a nuclear densitometer.

A3.5.5 Storage

Storage is not applicable.